TSG-RAN Meeting #19 **RP-030192**
Birmingham, UK, 11-14- Mar 2003

Multiple Input Multiple Output Antennas (MIMO)

Work item sheet description

Title

Multiple Input Multiple Output Antennas

1 3GPP Work Area

X	Radio Access
	Core Network
	Services

2 Linked work items

MIMO Physical Layer
MIMO Layer 2 and 3 Protocol Aspects
MIMO UTRAN Iub Protocol Aspects
MIMO RF Radio Transmission/ Reception, System Performance Requirements and Conformance Testing

3 Justification

In RAN#11 MIMO was presented as part of the HSDPA feasibility study. It was agreed that MIMO offers significant performance gains with acceptable impact to both UE and UTRAN. MIMO shall be optional at the UE.

4 Objective

The purpose of this work item is to improve system capacity and spectral efficiency by increasing the data throughput in the downlink within the existing 5MHz carrier. This will be achieved by means of deploying multiple antennas at both UE and Node-B side.

The technical objective of this work item is the integration of MIMO functionality in UTRA, in line with recommendations from WG1, to improve capacity and spectral efficiency. The works tasks include the support for both FDD and TDD. In those cases where differences between FDD and TDD are identified, they should be considered as separate work tasks.

- For physical layer, the features include:
  - Physical Layer procedures

– For higher layers:
  – Signalling aspects
  – UE capabilities

- For Iur/Iub interface:
  For the adoption of MIMO some modifications to the present Iub signalling and user data streams may need to be included.

- For radio transmission and reception:
  - UE radio transmission and reception
  - BTS radio transmission and reception
  - BTS Conformance testing
  - Requirements for support of Radio Resource Management

5 Service Aspects

None

6 MMI-Aspects

None

7 Charging Aspects

None

8 Security Aspects

None

9 Impacts

Affects:	USIM	ME	AN	CN	Others
Yes		X	X		
No	X			X	X
Don't know					

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for endorsement at plenary#	Approved at plenary#	Comments
25.876	Multiple-Input Multiple Output Antenna Processing for HSDPA	WG1		RAN#18	RAN#21	
25.996	Spatial channel model for multiple input multiple output simulations	WG1			RAN#21	

Affected existing specifications				
Spec No.	CR	Subject	Approved at plenary#	Comments

11 Work item raporteurs

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12 Work item leadership

TSG RAN WG1

13 Supporting Companies

TSG-RAN

14 Classification of the WI (if known)

X	Feature (go to 14a)
	Building Block (go to 14b)
	Work Task (go to 14c)

14a The WI is a Feature: List of building blocks under this feature

(list of Work Items identified as building blocks)
MIMO Physical Layer
MIMO Layer 2 and 3 Protocol Aspects
MIMO UTRAN Iub Protocol Aspects
MIMO RF Radio Transmission/ Reception, System Performance Requirements and Conformance Testing

14b The WI is a Building Block: parent Feature

(one Work Item identified as a feature)

14c The WI is a Work Task: parent Building Block

(one Work Item identified as a building block)

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Multiple Input Multiple Output Antennas (MIMO) – Physical Layer

Work item sheet description

Title

Multiple Input Multiple Output Antennas – Physical Layer

1 3GPP Work Area

X	Radio Access
	Core Network
	Services

2 Linked work items

MIMO Layer 2 and 3 Protocol Aspects
MIMO UTRAN Iub Protocol Aspects
MIMO RF Radio Transmission/ Reception, System Performance Requirements and Conformance Testing

3 Justification

In RAN#11 MIMO was presented as part of the HSDPA feasibility study. It was agreed that MIMO offers significant performance gains with acceptable impact to both UE and UTRAN. MIMO shall be optional at the UE.

4 Objective

The technical objective of this work item is the integration of MIMO physical layer functionality in UTRA for both FDD and TDD.

The work task for physical layer procedures will also consider additional physical layer measurements that may be required.

5 Service Aspects

None

6 MMI-Aspects

None

7 Charging Aspects

None

8 Security Aspects

None

9 Impacts

Affects :	USIM	ME	AN	CN	Others
Yes		X	X		
No	X			X	X
Don't know					

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for endorsement at plenary#	Approved at plenary#	Comments
25.876	Multiple-Input Multiple Output Antenna Processing for HSDPA	WG1		RAN#18	RAN#21	
25.996	Spatial channel model for multiple input multiple output simulations	WG1			RAN#21	

Affected existing specifications				
Spec No.	CR	Subject	Approved at plenary#	Comments
25.211		Physical channels and mapping of transport channels onto physical channels (FDD)	RAN #21	
25.212		Multiplexing and channel coding (FDD)	RAN #21	
25.213		Spreading and modulation (FDD)	RAN #21	
25.214		FDD : Physical layer procedures	RAN #21	
25.215		Physical layer measurements (FDD)	RAN #21	
25.221		Physical channels and mapping of transport channels onto physical channels (TDD)	RAN #21	
25.222		Multiplexing and channel coding (TDD)	RAN #21	

25.223		Spreading and modulation (TDD)	RAN #21	
25.224		Physical layer procedures (TDD)	RAN # 21	
25.225		Physical layer; Measurements (TDD)	RAN #21	

11 Work item raporteurs

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12 Work item leadership

TSG RAN WG1

13 Supporting Companies

TSG-RAN

14 Classification of the WI (if known)

	Feature (go to 14a)
X	Building Block (go to 14b)
	Work Task (go to 14c)

14a The WI is a Feature: List of building blocks under this feature

14b The WI is a Building Block: parent Feature

Multiple Input Multiple Output Antennas (MIMO)

14c The WI is a Work Task: parent Building Block

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Multiple Input Multiple Output Antennas (MIMO) Layer 2,3 aspects

Work item sheet description

Title

Multiple Input Multiple Output Antennas – Layer 2,3 aspects

1 3GPP Work Area

X	Radio Access
	Core Network
	Services

2 Linked work items

MIMO Physical Layer
MIMO UTRAN Iub Protocol Aspects
MIMO RF Radio Transmission/ Reception, System Performance Requirements and Conformance Testing

3 Justification

In RAN#11 MIMO was presented as part of the HSDPA feasibility study. It was agreed that MIMO offers significant performance gains with acceptable impact to both UE and UTRAN. MIMO shall be optional at the UE.

4 Objective

The technical objective of this work item is the integration of MIMO physical layer functionality in UTRA to improve capacity and spectral efficiency. Some additional signalling may be required to support MIMO functionality

- For higher layers:
  - Signalling aspects
  - UE capabilities

5 Service Aspects

None

6 MMI-Aspects

None

7 Charging Aspects

None

8 Security Aspects

None

9 Impacts

Affects :	USIM	ME	AN	CN	Others
Yes		X	X		
No	X			X	X
Don't know					

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for endorsement at plenary#	Approved at plenary#	Comments
25.876	Multiple-Input Multiple Output Antenna Processing for HSDPA	WG1		RAN#18	RAN#21	
25.996	Spatial channel model for multiple input multiple output simulations	WG1			RAN#21	

Affected existing specifications				
Spec No.	CR	Subject	Approved at plenary#	Comments
25.306		UE Radio Access Capabilites	RAN#21	
25.331		Radio resource control (RRC) protocol specification	RAN#21	
25.321		Medium access control (MAC) protocol specification	RAN#21	

11 Work item raporteurs

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12 Work item leadership

TSG RAN WG2

13 Supporting Companies

TSG-RAN

14 Classification of the WI (if known)

	Feature (go to 14a)
X	Building Block (go to 14b)
	Work Task (go to 14c)

14a The WI is a Feature: List of building blocks under this feature

14b The WI is a Building Block: parent Feature

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14c The WI is a Work Task: parent Building Block

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Multiple Input Multiple Output Antennas (MIMO)- Iub/Iur Protocol Aspects

Work item sheet description

Title

Multiple Input Multiple Output Antennas- Iub/Iur Protocol Aspects.

1 3GPP Work Area

X	Radio Access
	Core Network
	Services

2 Linked work items

MIMO Physical Layer
MIMO Layer 2 and 3 Protocol Aspects
MIMO RF Radio Transmission/ Reception, System Performance Requirements and Conformance Testing

3 Justification

In RAN#11 MIMO was presented as part of the HSDPA feasibility study. It was agreed that MIMO offers significant performance gains with acceptable impact to both UE and UTRAN. MIMO shall be optional at the UE.

4 Objective

The technical objective of this work item is the integration of MIMO physical layer functionality in UTRA to improve capacity and spectral efficiency.

- For Iur/Iub interface:
  For the adoption of MIMO some modifications to the present Iub signalling and user data streams may need to be included.

5 Service Aspects

None

6 MMI-Aspects

None

7 Charging Aspects

None

8 Security Aspects

None

9 Impacts

Affects :	USIM	ME	AN	CN	Others
Yes		X	X		
No	X			X	X
Don't know					

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for endorsement at plenary#	Approved at plenary#	Comments
25.876	Multiple-Input Multiple Output Antenna Processing for HSDPA	WG1		RAN#18	RAN#21	
25.996	Spatial channel model for multiple input multiple output simulations	WG1			RAN#21	

Affected existing specifications				
Spec No.	CR	Subject	Approved at plenary#	Comments
TS 25.401		UTRAN Overall Description	RAN #21	
TS 25.420		UTRAN Iur Interface: General Aspects and Principles	RAN #21	
TS 25.422		UTRAN Iur interface signalling transport	RAN #21	
TS 25.423		UTRAN Iur Interface RNSAP Signalling	RAN #21	
TS 25.424		UTRAN Iur interface data transport & transport signalling for CCH data streams	RAN #21	
TS 25.425		UTRAN Iur interface user plane protocols for CCH data streams	RAN #21	
TS 25.426		UTRAN I_{ur} and I_{ub} Interface Data Transport & Transport Signalling for DCH Data Streams	RAN #21	

TS 25.430		UTRAN I_{ub} Interface General Aspects and Principles	RAN #21	
TS 25.432		UTRAN Iub interface signalling transport	RAN #21	
TS 25.433		UTRAN Iub Interface NBAP Signalling	RAN #21	
TS 25.434		UTRAN Iub interface data transport & transport signalling for CCH data streams	RAN #21	
TS 25.435		UTRAN Iub interface user plane protocols for CCH data streams	RAN #21	
TS 25.442		UTRAN Implementation Specific O&M Transport	RAN #21	

11 Work item raporteurs

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12 Work item leadership

TSG RAN WG3

13 Supporting Companies

TSG-RAN

14 Classification of the WI (if known)

	Feature (go to 14a)
X	Building Block (go to 14b)
	Work Task (go to 14c)

14a The WI is a Feature: List of building blocks under this feature

14b The WI is a Building Block: parent Feature

Multiple Input Multiple Output Antennas

14c The WI is a Work Task: parent Building Block

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Birmingham, UK, 11-14- Mar 2003

Multiple Input Multiple Output Antennas (MIMO) - RF Radio Transmission/ Reception, System Performance Requirements and Conformance Testing

Work item sheet description

Title

Multiple Input Multiple Output Antennas - RF Radio Transmission/ Reception, System Performance Requirements and Conformance Testing

1 3GPP Work Area

X	Radio Access
	Core Network
	Services

2 Linked work items

MIMO Physical Layer
MIMO Layer 2 and 3 Protocol Aspects
MIMO UTRAN Iub Protocol Aspects

3 Justification

In RAN#11 MIMO was presented as part of the HSDPA feasibility study. It was agreed that MIMO offers significant performance gains with acceptable impact to both UE and UTRAN. MIMO shall be optional at the UE.

4 Objective

The technical objective of this work item is the description of the MIMO characteristics, the system performance requirements and conformance testing.

- For radio transmission and reception:
  - UE radio transmission and reception
  - BTS radio transmission and reception
  - BTS Conformance testing

5 Service Aspects

None

6 MMI-Aspects

None

7 Charging Aspects

None

8 Security Aspects

None

9 Impacts

Affects :	USIM	ME	AN	CN	Others
Yes		X	X		
No	X			X	X
Don't know					

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for endorsement at plenary#	Approved at plenary#	Comments
25.876	Multiple-Input Multiple Output Antenna Processing for HSDPA	WG1		RAN#18	RAN#21	
25.996	Spatial channel model for multiple input multiple output simulations	WG1			RAN#21	

Affected existing specifications				
Spec No.	CR	Subject	Approved at plenary#	Comments
25.101		UE Radio Transmission and Reception (FDD)	RAN#21	
25.102		UE Radio Transmission and Reception (TDD)	RAN#21	
25.104		UTRA (BS) FDD; Radio transmission and Reception	RAN#21	
25.105		UTRA (BS) TDD; Radio transmission and Reception	RAN#21	

25.123		Requirements for support of Radio Resource Management (TDD)	RAN#21	
25.133		Requirements for support of Radio Resource Management (FDD)	RAN#21	
25.141		Base station conformance testing(FDD)	RAN#21	
25.142		Base station conformance testing(TDD)	RAN#21	

11 Work item raporteurs

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12 Work item leadership

TSG RAN WG4

13 Supporting Companies

TSG-RAN

14 Classification of the WI (if known)

	Feature (go to 14a)
X	Building Block (go to 14b)
	Work Task (go to 14c)

14a The WI is a Feature: List of building blocks under this feature

14b The WI is a Building Block: parent Feature

Multiple Input Multiple Output Antennas

14c The WI is a Work Task: parent Building Block